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(54) Abstract Title  
**Laryngeal tube retainer**

(57) A laryngeal or endo-tracheal tube retainer comprises a semi-rigid stylet 52, a soft curved stylet cap 68 and a tapered connection adapter 48. The laryngeal tube retainer is used to facilitate the removal of a laryngeal mask.



**FIG. 8**

**GB 2 357 437**

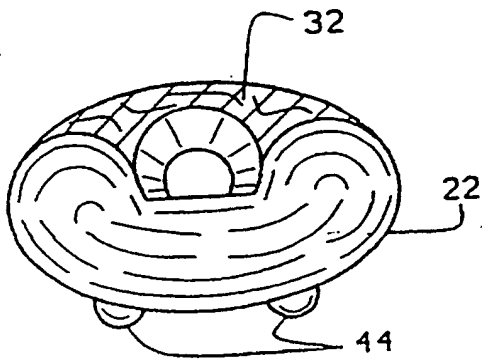


FIG. 5

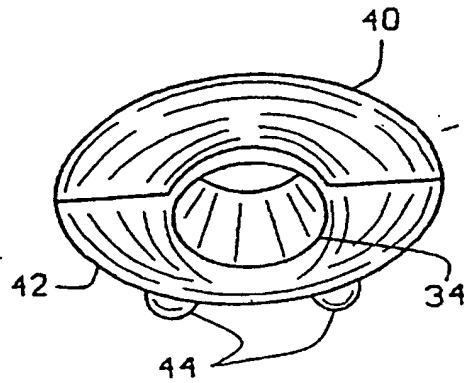


FIG. 6

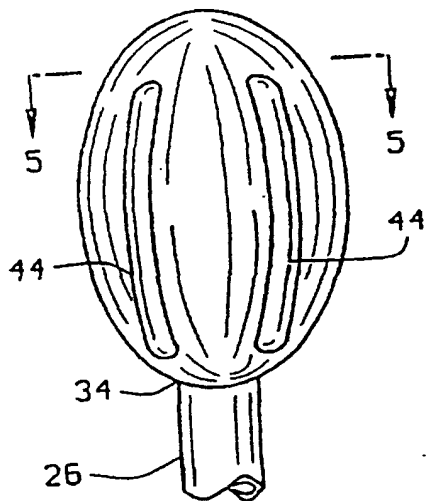


FIG. 4

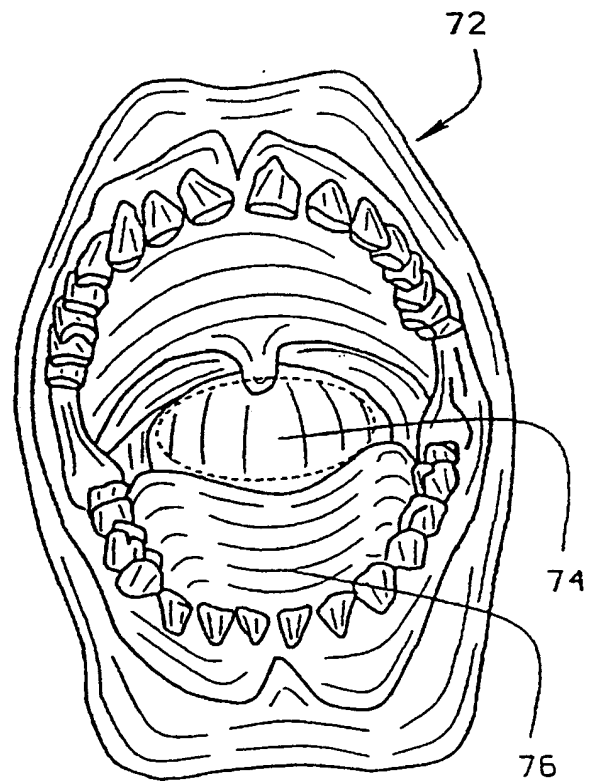


FIG. 7

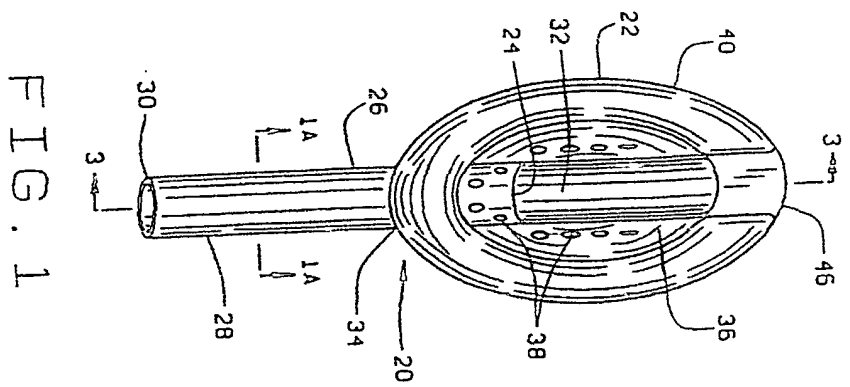


FIG. 1

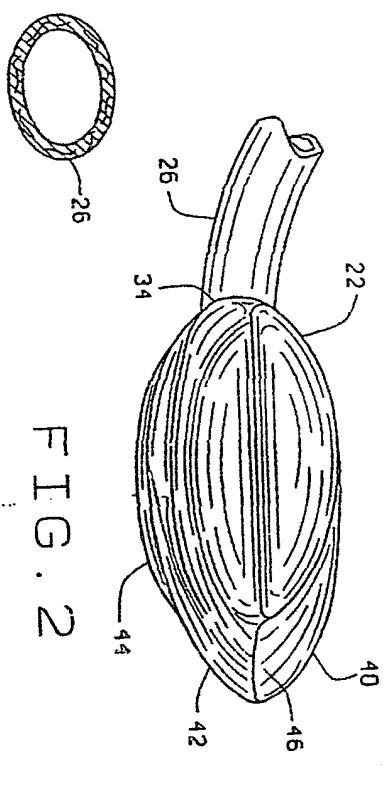


FIG. 2

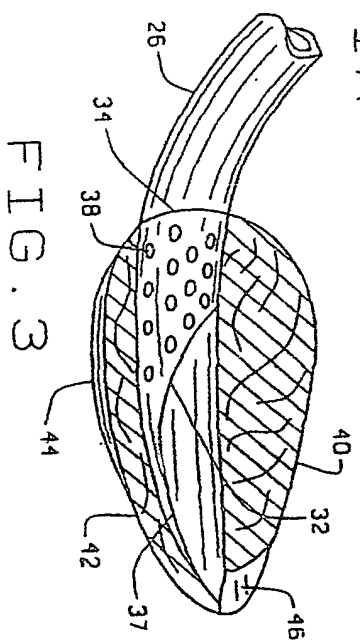


FIG. 3

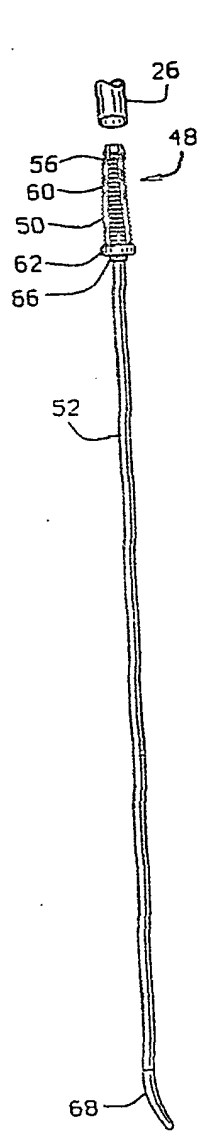


FIG. 8

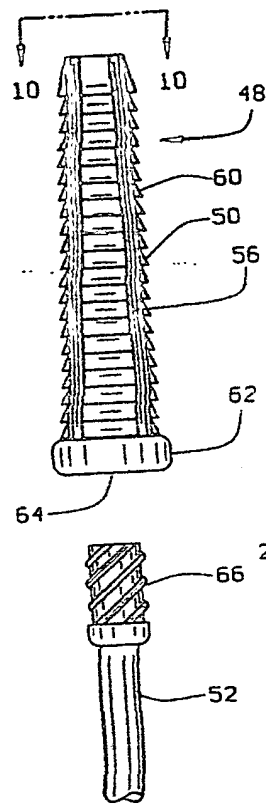


FIG. 9

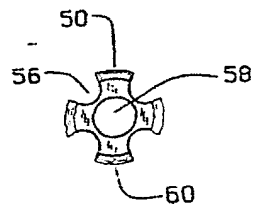


FIG. 10

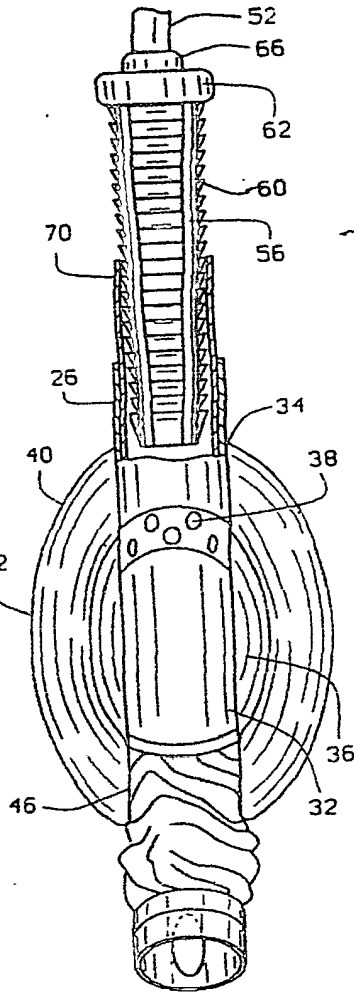


FIG. 11

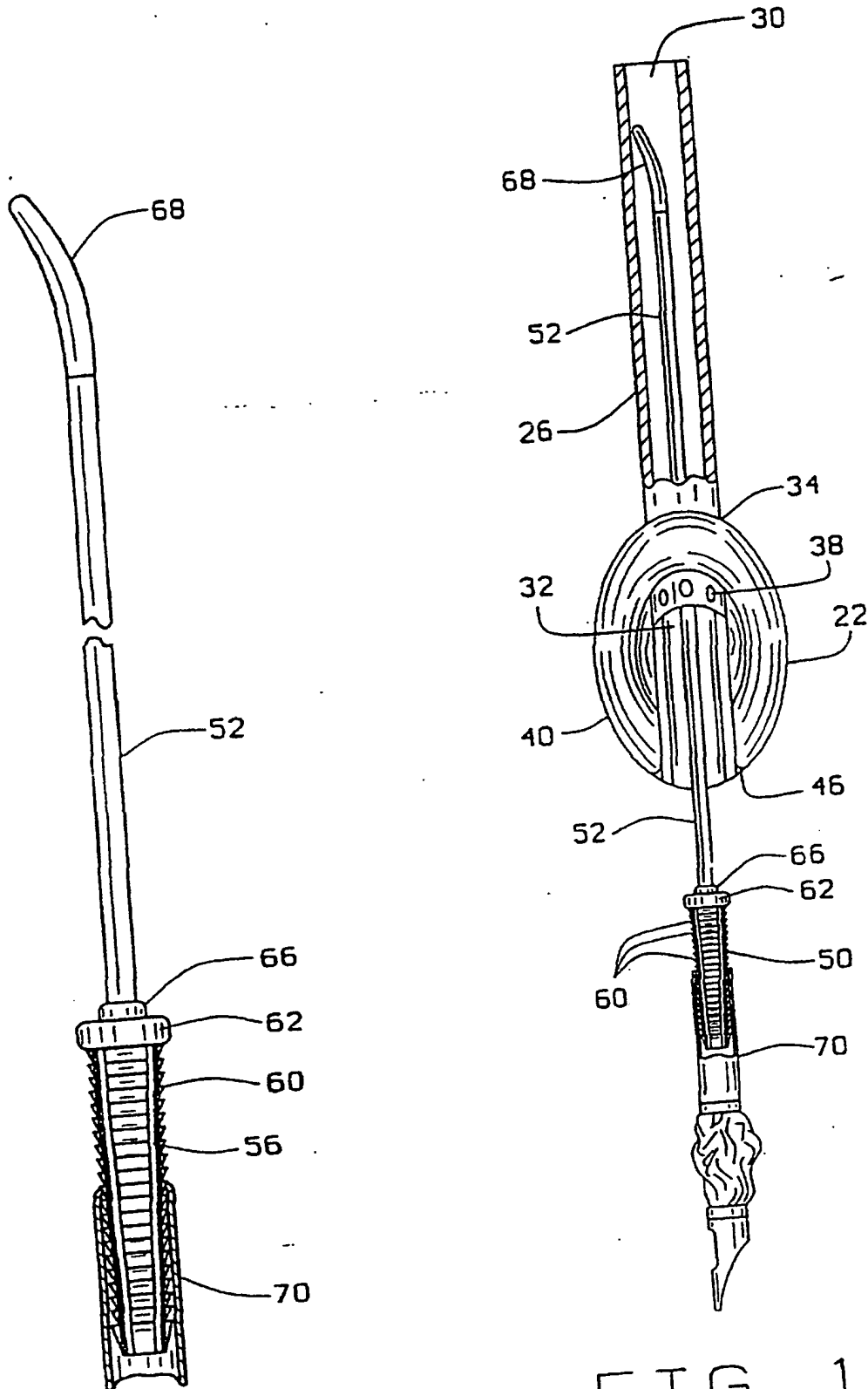


FIG. 13

Laryngeal Tube Retainer

## BACKGROUND OF THE INVENTION

5           This invention relates to an endo-tracheal tube retainer used to facilitate the removal of a laryngeal mask of the type used to facilitate lung ventilation and the insertion of endo-tracheal tubes or related medical instruments through a patient's laryngeal opening, said laryngeal mask being removed from a patient's oropharynx without dislodging any inserted endo-tracheal tubes or related medical instruments passing through  
10 the laryngeal mask into the patient's tracheal tube.

          In general, laryngeal masks allowing for both rapid lung ventilation and the insertion of medical instruments and tubes into the laryngeal openings of patients have been described in patents such as Brain, U.S. Pat. No. 4,509,514. Consisting of two  
15 essential parts, a breathing tube and an inflatable mask, these devices are inserted blindly into a patient's throat, and when properly positioned, terminate at the laryngeal opening. A seal is then formed around the circumference of the laryngeal opening by the inflation of a ring-like structure located on the front of the mask. Inflation of the ring exerts pressure against both the front and rear portions of the oropharynx, securing the device in  
20 place such that the laryngeal opening is positioned within a recessed cavity in the mask face. Extending from a point external to the oral cavity, the flexible breathing tube terminates within the recessed cavity, aligned axially with the laryngeal opening. The positioning of the flexible breathing tube allows the passage of small diameter endo-tracheal tubes or related medical instruments into the laryngeal opening, in addition  
25 to allowing for lung ventilation.

          Current laryngeal masks have several drawbacks in the areas of placement, lung ventilation, and endo-tracheal intubation. For example, during insertion and positioning, the flexible nature of the deflated ring structure and surrounding mask may

allow the distal end of the mask to bend back on itself, preventing proper inflation and the formation of a tight seal. Also, once successfully installed, the current mask designs may fail to exert sufficient pressure against the larynx necessary to maintain proper positioning during intubation and ventilation. This is due to the variations in anatomy of the oropharynx region, the muscular tension against which the mask is exerting pressure, and the curvature of the device itself.

During lung ventilation, it is possible for the tip of the epiglottis to become lodged in the distal lumen of the flexible breathing tube, preventing the passage of air or endo-tracheal tubes. This problem is often overcome by the placement of a series of band structures at the entrance to the distal lumen, preventing the epiglottis from entering the breathing tube. However, these band structures severely restrict the size of endo-tracheal tubes and related medical devices which may be passed through the flexible breathing tube. Furthermore, after the insertion of an endo-tracheal tube or related medical device, it often becomes difficult to remove the laryngeal mask from the patient's oropharynx without dislodging or accidentally extracting the endo-tracheal tube or medical device along with the laryngeal mask.

The endo-tracheal tube retainer of the present invention, when used in conjunction with a removable laryngeal mask as described hereinafter, overcomes problems associated with the prior art.

## SUMMARY OF THE INVENTION

According to the present invention there is provided an endo-tracheal tube retainer used to facilitate the removal of a laryngeal mask of the type used to facilitate lung ventilation and the insertion of endo-tracheal tubes or related medical instruments through a patient's laryngeal opening, said laryngeal mask being removed from a patient's oropharynx without dislodging any inserted endo-tracheal tubes or related medical

instruments passing through the laryngeal mask into the patient's tracheal tube, said endo-tracheal tube retainer comprising:

a semi-rigid stylet having proximal and distal ends;

a soft curved stylet cap secured to said proximal end of said stylet; and

a connection adapter tapered from a proximal end of said connection adapter to a distal end of said connection adapter for secure insertion within a range of endo-tracheal tubes, removably secured to said distal end of said stylet.

The endo-tracheal tube retainer may be used to facilitate the removal of a laryngeal mask of the type having a flexible respiratory tube, and said endo-tracheal tube retainer is sufficiently small in diameter to pass through said flexible respiratory tube.

In one embodiment, the stylet may be adapted for use independently of the endo-tracheal tube as an intubating stylet.

In a further embodiment, the stylet may be of sufficient length to extend from the laryngeal opening to a point external to a patient's oral cavity.

The connection adapter may be removably secured to said stylet by means of a threaded connector.

The exterior surface of said connection adapter may comprise:

a plurality of longitudinal grooves permitting passage of air and fluids past said endo-tracheal tube retainer after insertion within an endo-tracheal tube; and



on the inflatable mask, both aiding in the insertion and positioning of the device within the oropharynx. Additionally, the laryngeal mask may include a perforated extension of the flexible breathing tube within the inflatable mask portion so as to provide alternate airways in the event the distal lumen is blocked. Furthermore, the laryngeal mask may include a flexible breathing tube having an elliptical cross-section, composed of a deformable, low friction material so as to permit the passage of large diameter endo-tracheal tubes and related medical instruments.

Briefly stated, the removable laryngeal mask to be used in conjunction with the present invention may be primarily intended to facilitate lung ventilation and the insertion of endo-tracheal tubes or related medical instruments into a patient's trachea as needed during general anaesthesia, intensive care, or critical patient care. The removable laryngeal mask may comprise a flexible ventilation tube and an inflatable positioning shield conforming to the anatomy of the oropharynx region surrounding the laryngeal opening, and securely affixed to the distal end of the ventilation tube. A separate endo-tracheal tube retainer of the present invention may facilitate removal of the laryngeal mask from the patient's oropharynx without dislodging any endo-tracheal tubes or related medical instruments passing through the laryngeal mask into the patient's trachea.

The flexible ventilation tube of the laryngeal mask may be gently curved along an arc approximating the curvature of the passage from a patient's oral cavity to the laryngeal region. The ventilation tube may be of sufficient length that the tube terminates exterior to the oral cavity after proper insertion and positioning of the laryngeal mask, thereby allowing endo-tracheal tubes and related medical devices to be easily inserted or attached. The ventilation tube may be composed of a low-friction elastic plastic polymer, and has an elliptical cross section closely conforming to the actual cross section of the human throat. Large diameter endo-tracheal tubes and related medical instruments may pass freely through the flexible ventilation tube due to the low friction nature of the plastic polymer and the ability of the tube to deform to accommodate the larger diameter medical

instruments. Passing through the rear portion of the inflatable positioning shield, the flexible ventilation tube may terminate at an angle to the length of the tube, creating an elongated distal lumen open to the front recess of the inflatable positioning shield. The elongated distal portion of the ventilation tube forming the distal lumen may serve the additional function of providing a semi-rigid substructure onto which the inflatable positioning shield may be secured.

In addition to the elongated elliptical distal lumen, the peripheral surface of the flexible ventilation tube distal end may contain numerous auxiliary ventilation lumens open to the front recess of the inflatable positioning shield. These auxiliary ventilation lumens may function to provide alternate air passageways in the event the primary distal lumen becomes obstructed during the use of the laryngeal mask. Airflow through the auxiliary ventilation lumen may prevent the formation of a pressure gradient between the ventilation tube and the front recess, thereby preventing any obstructing material from becoming lodged within the distal lumen.

Secured to the elongated distal portion of the flexible ventilation tube by an air-tight seal, the inflatable positioning shield may serve to secure the laryngeal mask within a patient's oropharynx, adjacent the tracheal opening. The inflatable positioning shield may be composed of an inflatable annular toroid, a recessed front cavity, and several semi-rigid structures molded to fit the anatomy of the laryngeal region. During insertion of the laryngeal mask, the inflatable annular toroid may be deflated, reducing the overall size of the laryngeal mask and facilitating proper insertion. Upon positioning adjacent the laryngeal opening, the annular toroid may be inflated by means of an externally connected air passage, conforming to the actual and potential space surrounding the rear and peripheral portions of the ventilation tube distal lumen. The inflated annular toroid may exert pressure against the structures of the oropharynx, forming a tightly sealed recessed front cavity surrounding the elongated elliptical distal lumen and the laryngeal opening. A pair of raised longitudinal ridges on the rear surface of the inflatable positioning shield

and a frontal notch conforming to the tracheal anatomy may further serve to aid in maintaining proper positioning of the laryngeal mask after inflation by preventing lateral movement within the oropharynx cavity. The ridges may also facilitate placement by reducing drag.

5

Upon proper inflation, endo-tracheal tubes and related medical devices passing through the flexible ventilation tube may exit the elongated distal lumen axially aligned for entry into the laryngeal opening. Removal of the laryngeal mask from the oropharynx may be accomplished without dislodging any inserted endo-tracheal tubes or  
10 related medical devices with the aid of an endo-tracheal tube retaining device. The retaining device of the present invention, composed of a narrow semi-rigid rod with a softer and pliable cap at one end and a tapered connection adapter at the other, may be inserted through the laryngeal mask into the proximal end of an endo-tracheal tube until the tapered connection adapter is securely fitted within the tube. As the laryngeal mask is  
15 withdrawn from the patient's oropharynx, the endo-tracheal tube retaining device may maintain the proper positioning of the endo-tracheal tube by allowing a restraining force to be exerted counter to the friction force associated with the withdrawal of the laryngeal mask. Once clear of the oral cavity, the laryngeal mask may be slipped off the proximal end of the endo-tracheal tube retaining device, allowing the endo-tracheal tube or related  
20 medical instrument to remain properly positioned within the larynx. Finally, the semi-rigid rod of the endo-tracheal tube retaining device can also be used as an intubating stylet for any further medical devices which need to be passed through the oropharynx and into the inserted endo-tracheal tube after removal of the laryngeal mask. Of course the rod can also be used separately as an intubating stylet for direct visualization.

25

These and other objects and advantages of the present invention will become more apparent from the description that follows.

#### BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, Figure 1 is a top view of the laryngeal mask which may be used in conjunction with the present invention illustrating the flexible breathing tube and the inflatable positioning shield;

Fig. 1A is a cross-sectional view taken along line 1A-1A in Fig. 1;

Figure 2 is a side view of the inflatable positioning shield after inflation;

Figure 3 is a sectional view of the inflatable positioning shield after inflation, taken along line 3--3 of Figure 1;

Figure 4 is bottom view of the inflatable positioning shield;

Figure 5 is a sectional view of the inflatable positioning shield after inflation, taken along line 5--5 of Figure 4, illustrating the recessed front of the positioning shield and the unobstructed distal lumen of the flexible breathing tube;

Figure 6 is a rear view of the inflatable positioning shield after inflation, with the flexible breathing tube removed;

Figure 7 is an artists rendition of a patient's oral cavity, illustrating the elliptical nature of the opening into the oropharynx region;

Figure 8 is a plan view of the endo-tracheal tube retainer of the present invention, illustrating the soft cap portion;

Figure 9 is a plan view of the endo-tracheal tube retainer, illustrating the separation of the tube retainer body from the connection adapter;

Figure 10 is a front view of the distal end of the connection adapters, illustrating the air-flow grooves;

Figure 11 is a plan view of the laryngeal mask of the present invention during use, showing interaction with an endo-tracheal tube and the endo-tracheal tube retainer;

Figure 12 is a plan view of endo-tracheal tube retainer during use, illustrating proper position of the tube retainer within an endo-tracheal tube; and

Figure 13 is a plan view of the laryngeal mask of the present invention during removal, illustrating the operation of the endo-tracheal tube retainer.

Corresponding reference numerals will be used throughout the several figures of the drawings.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

5

The following detailed description illustrates the invention by way of example and not by way of limitation. The description will clearly enable one skilled in the art to make and use the invention, describes several embodiments, adaptations, variations, alternatives, and uses of the invention, including what we presently believe is the best  
10 mode of carrying out the invention.

Referring to the drawings, and particularly Figures 1-3 inclusive, the removable laryngeal mask which may be used in conjunction with the present invention is shown generally at 20. The laryngeal mask 20 comprises an inflatable positioning shield  
15 22 secured to the distal end 24 of a respiratory tube 26, forming a smooth arcuate curve as shown in Figure 3. Composed of a flexible silicone-rubber polymer, respiratory tube 26 has an elliptical cross-section (see Fig. 1A), approximating, for ease of insertion, the shape of the human throat shown in Figure 7. Capable of spreading radially, respiratory tube 26 can accommodate the passage of cuffed endo-tracheal tubes and related medical devices  
20 up to 8.0 French in diameter. The length of respiratory tube 26 is such that when the laryngeal mask 20 is properly positioned for use within the oropharynx, the attachment end 28 of respiratory tube 26 is located exterior to the oral cavity. The attachment end 28 of the respiratory tube 26 terminates in an unobstructed proximal lumen 30, providing a direct pathway through the respiratory tube 26 to the distal end 24 and distal lumen 32. The  
25 attachment end 28 may alternatively be fitted with adapters or connectors (not shown) suitable for connection to a variety of medical devices, for example, lung ventilation machines.

The distal end 24 is the continuous portion of respiratory tube 26 which has passed through an airtight peripheral seal 34 at the rear of the inflatable positioning shield 22, and into the shield recess 36. The distal end 24 terminates at an angle to its length, forming the elongated elliptically shaped distal lumen 32 open to the interior of the shield recess 36. The elongated lower surface of the distal end forms the shield support 37, and provides a semi-rigid structure onto which the positioning shield 22 is secured. Numerous ventilation lumen 38 perforate the distal end 24 to provide alternate airways in the event the distal lumen 32 becomes obstructed during patient lung ventilation. The ventilation lumen 38 prevent the formation of a pressure differential between the shield recess 36 and flexible respiratory tube 26. Absent a pressure differential, any object obstructing the distal lumen 32 will not become inextricably lodged within the distal end 24.

The inflatable positioning shield 22 is composed of a wedge-shaped toroid 40, and a pliable moulded posterior base 42. Inflation of the toroid 40 is accomplished by means of a conventional inflation device (not shown), forming an ovoid shape conforming to the approximate available space in the oropharynx region. The posterior base is secured longitudinally in an airtight manner to the lower surface of the shield support 37. The posterior base 42 forms an elongated and tapered hemisphere, best seen in Figures 2-4. Two semi-rigid raised runners 44 formed of moulded silicone rubber are positioned longitudinally parallel to each other along the lower surface of the posterior base 42. During insertion of the laryngeal mask 20, the raised runners 44 guide the placement of the inflatable positioning shield 22, aid in preventing lateral movement by fitting to the rear anatomy of the oropharynx region, and facilitate placement by decreasing drag. In fluid communication with the posterior base 42, the annular toroid 40 is secured to the peripheral upper surface of the posterior base 42, and inflates simultaneously to form the shield recess 36. A tracheal notch 46 is formed in the portion of the annular toroid 40 traversing the front of the inflatable positioning shield 22, best seen in Figure 1. The tracheal notch 46 surrounds the trachea after proper positioning and inflation of the

laryngeal mask 20, preventing lateral movement and creating a better air-tight fit with the trachea.

5 During use, the laryngeal mask 20 is inserted through the oral cavity with the annular toroid 40 fully deflated. The smooth arcuate curve of the combined respiratory tube 26 and positioning shield 22 ensures proper positioning of the laryngeal mask 20 within the anatomy surrounding the laryngeal opening. Upon proper positioning, as determined by a resistance to further forward motion, the annular toroid 40 is inflated as described above. When fully inflated, the annular toroid 40 exerts sufficient pressure  
10 against the structures of the oropharynx to form a tight seal surrounding the laryngeal opening. Positioned within the shield recess 36, the distal lumen 32 is axially aligned with the laryngeal opening, permitting positive lung ventilation to be performed, or allowing endo-tracheal tubes or related medical instruments inserted through the respiratory tube 26 to exit the distal lumen 32, directly aligned for passage into the laryngeal opening.

15

Removal of the laryngeal mask 20 is normally the reverse of the insertion procedure described above. In some situations, however, it is desired to remove the laryngeal mask 20 without simultaneously removing or dislodging endo-tracheal tubes or related medical devices passing through respiratory tube 26 into the laryngeal opening.  
20 Referring generally to Figures 8-13, removal of the laryngeal mask 20 under such circumstances is facilitated by means of a tube retainer of the present invention, shown generally at 48.

25 Tube retainer 48 comprises a connection adapter 50, a stylet rod 52, and an endcap 68. Connection adapter 50 is composed of a soft semi-rigid material forming a truncated conical structure having four equidistantly positioned longitudinal ventilation grooves 56. Each ventilation groove 56 permits the passage of air around the connection adapter 50 after insertion within an endo-tracheal tube as shown generally in Figures 11-13. The exterior surface of connection adaptor 50 between each ventilation groove 56

is threaded with threads 60. Each thread 60 is angled and shaped so as to facilitate insertion of the connection adapter 50 into an endo-tracheal tube by means of a longitudinally directed force applied to the adapter, but to exert a resistive force against the removal of connection adapter 50 from an endo-tracheal tube in opposition to an oppositely directed longitudinally applied force. Alternatively, the adapter may be screwed into place, and unscrewed, as desired. The conical nature of the connection adapter 50 permits the tube retainer 48 to fit securely within the opening of a variety of endo-tracheal tubes, ranging from standard size No.6 through standard size No.8 tubes. The present invention may be adapted as desired to accommodate larger and/or smaller tubes without departing from the scope of the present invention. As the tube retainer 48 is inserted within the opening of an endo-tracheal tube, the increasing exterior diameter of the connection adapter 50 prevents insertion beyond a certain point, limited by the interior diameter of the endo-tracheal tube.

The connection adapter 50 is secured at its base to a disk-shaped adapter base 62. Stylet rod 52 is a semi-rigid, circular cross-section rod. The length of stylet rod 52 is sufficient to traverse the distance between a point external to a patient's oral cavity and the laryngeal opening. During the insertion of the rod retainer 48 within an endo-tracheal tube or related medical instrument, the end of stylet rod 52, external to the oral cavity, consists of a softer stylet cap 68. Of course, rod 52 may be used separately as an intubating stylet for direct visualization by unscrewing connector adapter 50 from rod 52 and placing cap 68 into the trachea directly. The soft cap 68 is designed and configured to reduce potential tracheal trauma when used as an intubating stylet.

Figures 11 - 13 illustrate the use of the tube retainer 48 of the present invention during removal of an laryngeal mask 20. As described above, the use of a tube retainer 48 prevents the displacement of any inserted endo-tracheal tubes during removal of the laryngeal mask 20. The connection adapter 50 of tube retainer 48 is secured to the stylet rod 52 and passed through the respiratory tube 26. The connection adapter 50 partially enters the proximal opening of the inserted endo-tracheal tube 70 as shown in



Figure 11. The length of the stylet rod 52 is sufficient to extend beyond the oral cavity after insertion within the endo-tracheal tube 70, allowing manipulation of the tube retainer as needed to ensure a secure insertion. As shown in Figure 13, the laryngeal mask 20, may then be removed from the oropharynx without dislodging the endo-tracheal tube 70 by  
5 sliding the laryngeal mask 20 along the tube retainer 48. Tube retainer 48 allows force to be exerted through the stylet rod 52 and connection adapter 50 on the endo-tracheal tube 70, resisting the tendency of the endo-tracheal tube 70 to withdraw from the laryngeal opening as the laryngeal mask 20 is removed. Once clear of the oral cavity, the laryngeal mask 20 is simply slid over the stylet cap 68 on the tube retainer 48, allowing the  
10 endo-tracheal tube to remain in place within the patient's laryngeal opening. The stylet is then removed by unscrewing it from the endo-tracheal tube.

In view of the above, it will be seen that all the objects and features of the present invention are achieved, and other advantageous results obtained. The description  
15 of the invention contained herein is illustrative only, and is not intended in a limiting sense.

Claims

1. An endo-tracheal tube retainer used to facilitate the removal of a laryngeal mask of the type used to facilitate lung ventilation and the insertion of endo-tracheal tubes or related medical instruments through a patient's laryngeal opening, said laryngeal mask being removed from a patient's oropharynx without dislodging any inserted endo-tracheal tubes or related medical instruments passing through the laryngeal mask into the patient's tracheal tube, said endo-tracheal tube retainer comprising:

10 a semi-rigid stylet having proximal and distal ends;

a soft curved stylet cap secured to said proximal end of said stylet; and

15 a connection adapter tapered from a proximal end of said connection adapter to a distal end of said connection adapter for secure insertion within a range of endo-tracheal tubes, removably secured to said distal end of said stylet.

2. The endo-tracheal tube retainer of claim 1 wherein said endo-tracheal tube retainer is used to facilitate the removal of a laryngeal mask of the type having a flexible respiratory tube, and said endo-tracheal tube retainer is sufficiently small in diameter to pass through said flexible respiratory tube.

3. The endo-tracheal tube retainer of claim 1 wherein said stylet is adapted for use independently of the endo-tracheal tube as an intubating stylet.

4. The endo-tracheal tube retainer of claim 3 wherein said stylet is of sufficient length to extend from the laryngeal opening to a point external to a patient's oral cavity.

5. The endo-tracheal tube retainer of claim 1 wherein said connection adapter is removably secured to said stylet by means of a threaded connector.

6. The endo-tracheal tube retainer of claim 1 wherein the exterior surface of said connection adapter comprises:

a plurality of longitudinal grooves permitting passage of air and fluids past said endo-tracheal tube retainer after insertion within an endo-tracheal tube; and

a plurality of threads angled to facilitate insertion of said endo-tracheal tube retainer within an endo-tracheal tube, but hindering withdrawal of said endo-tracheal tube retainer from said endo-tracheal tube.

7. The endo-tracheal tube retainer of claim 6 wherein the connection adapter is composed of soft, semi-rigid material, sufficiently flexible to permit said connection adapter to traverse through said endo-tracheal tube after positioning within the oropharynx region.

8. The endo-tracheal tube retainer of claim 6 wherein said longitudinal grooves are equispaced around said connection adapter exterior surface.

9. The endo-tracheal tube retainer of claim 8 wherein there are at least four longitudinal grooves.

10. Use of a tube retaining device in a method for removing an inflatable laryngeal mask from a patient without dislodging an inserted endo-tracheal tube or related medical instrument passing through said inflatable laryngeal mask into the patient's laryngeal opening by using a tube retaining device, the method comprising the steps of:

inserting the tube retaining device into a previously inserted endo-tracheal tube;

securing the tube retaining device within the proximal end of the previously inserted endo-tracheal tube;

deflating said inflatable laryngeal mask;

simultaneously withdrawing said deflated inflatable laryngeal mask from the patient's oral cavity while providing a retaining force on the tube retaining device sufficient to prevent friction from dislodging said endo-tracheal tube; and

sliding the inflatable laryngeal mask off the proximal end of said tube retaining device.

11. The method of use of a tube retaining device as set forth in claim 10 wherein the tube retaining device is inserted through the inflatable laryngeal mask opening exterior to the oral cavity, said endo-tracheal tube being disposed at least partially within said inflatable laryngeal mask.

12. A laryngeal mask of the type used to facilitate lung ventilation and the insertion of endo-tracheal tubes or related medical instruments through a patient's laryngeal opening as used during general anaesthesia, intensive care, or critical patient care comprising:

an inflatable positioning shield formed to fit within a patient's oropharynx and seal around the circumference of the laryngeal opening, said shield

having an inflatable annular toroid peripheral portion, a contoured rear portion, and a recessed front; and

5 a flexible respiratory tube having a proximal end lumen, a gently curved tubular body of sufficient size to permit passage of endo-tracheal tubes, and related medical instruments, and a distal end passing through and secured to the proximal edge of said annular toroid peripheral portion, said distal end terminating at a distal lumen within the recessed front of the inflatable positioning shield such that tubes and instruments passing through the  
10 flexible respiratory tube will be directed into the laryngeal opening.

13. The laryngeal mask of claim 12 wherein the flexible respiratory tube and the inflatable positioning shield are gently curved along the same arcuate curve such that minimal bending of the flexible respiratory tube is required during positioning of the  
15 laryngeal mask around the laryngeal opening.

14. The laryngeal mask of claim 12 wherein the flexible respiratory tube has an elliptical cross-section *facilitating insertion of the laryngeal mask* through the oral cavity.

20 15. The laryngeal mask of claim 14 wherein the flexible respiratory tube is composed of a material with a low coefficient of friction to facilitate the delivery of endo-tracheal tubes and related medical instruments through the flexible respiratory tube to the laryngeal opening.

25 16. The laryngeal mask of claim 15 wherein the material of the flexible respiratory tube because of its elliptical shape and flexible nature can deform radially to allow passage of endo-tracheal tubes and related medical instruments having large circular cross-section shape, returning to the original elliptical cross-section shape upon the removal of said endo-tracheal tubes and related instruments.

23. The laryngeal mask of claim 22 wherein the front surface of the distal edge of said inflatable positioning shield is notched to securely surround the trachea after inflation, preventing lateral movement of the laryngeal mask.
- 5 24. The laryngeal mask of claim 12 wherein the contoured rear portion of the inflatable positioning shield is inflatable with air to conform to the rear anatomical surfaces of the oropharynx region and to exert sufficient pressure against said surfaces so as to securely retain the laryngeal mask in place.
- 10 25. The laryngeal mask of claim 24 wherein the contoured rear portion of the positioning shield has a plurality of parallel raised lengthwise runners to facilitate insertion and positioning within the oropharynx, said runners exerting pressure against the back of the oropharynx and stabilizing the inflatable positioning shield around the laryngeal opening and being positioned to reduce drag during insertion.
- 15 26. The laryngeal mask of claim 25 wherein the raised lengthwise runners are continuous extensions of the contoured rear surface.
- 20 27. The laryngeal mask of claim 12 wherein the inflatable positioning shield is secured in an air-tight manner to the exterior surface of the distal end of said flexible respiratory tube where it passes through the annular toroid peripheral portion into the recessed front.
- 25 28. The laryngeal mask of claim 27 wherein the recessed front of the inflatable positioning shield is in fluid communication with the distal lumen of said flexible respiratory tube.

29. The laryngeal mask of claim 12 wherein the inflatable positioning shield is of sufficient size to enclose the laryngeal opening within the recessed front and to fit securely within the oropharynx anatomy.

5 30. A laryngeal mask of the type used to facilitate lung ventilation and the insertion of endo-tracheal tubes and related medical instruments into the laryngeal opening as needed during general anaesthesia, intensive care, or critical patient care, comprising:

10 an inflatable positioning shield gently curved to fit securely within the anatomical structures of the oropharynx region when inflated, said positioning shield enclosing the laryngeal opening within a recessed front, and having an inflatable annular toroid peripheral portion forming a seal around the circumference of the laryngeal opening, a plurality of lengthwise raised ridges protruding from a contoured rear portion, and a notched distal  
15 end fitted to the trachea to prevent lateral motion of the inflatable positioning shield after inflation within the oropharynx; and

20 a flexible respiratory tube having an proximal end lumen, a gently curved tubular body having an elliptical cross-section and sufficiently radially deformable to permit passage of endo-tracheal tubes and related medical instruments, and a perforated distal end passing through and secured in an air-tight manner to the proximal edge of said inflatable positioning shield, terminating at an angular distal lumen within the recessed front of said  
25 inflatable positioning shield so as to be aligned axially with the laryngeal opening upon insertion into the oropharynx.

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